Mount Diablo Astronomical Society

Diablo MoonWatch

August 2013

General Meeting

Tuesday August 27 2013

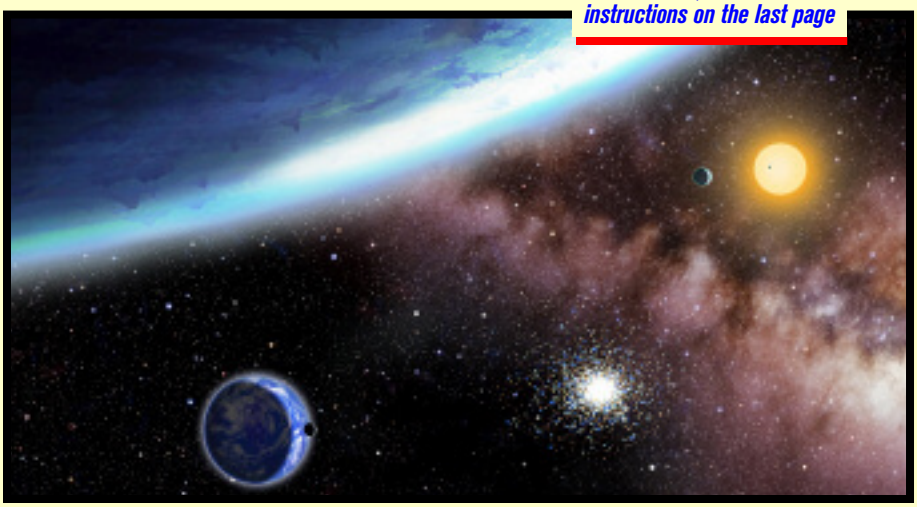
NASA's Search for Earth-sized Planets

By Dr. Gibor Basri

Doors open at 6:45 p.m.
Lindsay Wildlife Museum
1931 First Avenue,
Walnut Creek, CA 94597

Please park East of the museum, follow the instructions on the last page

Four years ago a dedicated space telescope ("Kepler") was launched to search for terrestrial planets around other stars, and even possibly discover a planet that might be like the Earth.



The main purpose of the mission is to find out how common smaller planets are. This month, Professor Gibor Basri will explain how the mission works, and highlight some of its most amazing discoveries. Nearly 3500 potential planets have been found, including many in multiple planet systems. The most common planet may be something that we don't have in our own Solar System: "super-Earths" which are 1.5-3 times as big as our planet. Some of these may be rocky, some may be "water worlds," and some may be more like warm mini-Neptunes. The Kepler mission is rapidly leading us to the conclusion that most stars have planets going around them, and the number of earth-sized planets in our Galaxy could easily be in the billions.

Gibor Basri has been a faculty member of the Astronomy department at UC Berkeley for 30 years. He is best known for his pioneering work on brown dwarfs. He produced a number of first discoveries on these "cosmic missing links" between stars and planets. He helped define their relation to stars and used them to inform the debate on "what is a planet?" Another major area of research has been star and planet formation, including the magnetic interface between newly forming stars and their surrounding protoplanetary disks. Prof. Basri has extensively studied the role of magnetism in the history of solar-type and low-mass stars. He is a Co-Investigator on NASA's Kepler exoplanet mission, which enables unprecedented detail on starspots and other magnetic activity for large numbers of stars. In addition to astrophysics, Prof. Basri has always worked to increase the participation of minorities in science, and is the founding Vice Chancellor for Equity and Inclusion at UC Berkeley.

Are all the Stars like our Sun?

Presented by Marni Berendsen

What's Up

We often hear that the Sun is an "average" star or "Our Sun is a star, like all the stars we see in the night sky." To what degree is that true? We'll take a overview of the stars of our Galaxy and see where the Sun–and several other familiar stars–fit in. Next time you gaze skyward, you might look at the stars in a new light!

President's Corner

Changes In The Astronomy Equipment Market

by Chris Ford

As I write (early August) there are significant changes occurring in the amateur astronomy equipment market.

I was prompted to write on this topic mainly because of the difficulties currently being experienced by Meade, who along with Celestron and Orion, are undoubtedly the best known supplier of general consumer amateur astronomy telescopes, mounts, eyepieces, and other accessories outside of the high-end specialists such as Televue, Obsession, Takahashi, Astro-Physics and others.

As of this time the publicly listed Meade Instruments is in very bad financial shape with forecasted losses of $3M on approximately $10M of annual revenues, and is now facing bankruptcy. Though Meade has been in a parlous financial condition for the past few years, it is startling to consider that only 10 years ago their annual revenues exceeded $100M with good margins. So what has happened?

A big part of Meade's predicament appears to be that the mass-market department store telescopes that the company used to badge and sell in volume are now being sold directly by their Chinese manufacturers bypassing Meade entirely. Just as significantly, launches of recent higher-end product lines such as the RCX, LX-80, and LX-800 were in some cases premature, poorly executed, or the technology did not deliver as promised. That is not to downplay or ignore that many Meade customers have been quite satisfied with their purchases, but it is hard to escape the many technical issues associated with recent product launches as endlessly reported on the internet.

The appearance of new Chinese vendors such as iOptron, Explore Scientific, Astro-Tech etc, who supply their products directly to market, the greater variety of alternative telescope designs to the classic Schmidt Cassegrain's Telescopes (SCT's) that Meade is famous for, and all the above mentioned product and support issues has left Meade in a highly vulnerable position where its stock is almost worthless and the entire company, IP, and its brand is now only valued in the $4M range. The result is that Meade is now in the stages of being acquired by one of two competing Chinese optical suppliers and this month the companies fate will likely be resolved as will its Californian administrative and Mexican manufacturing operations. It is most likely that the old Meade as we knew it will disappear or at least change radically, even if its brand name will probably remain as a channel for Chinese manufactured telescopes, but associated with what type of products aimed at what audience is to be seen.

Changes In The Astronomy Equipment Market *(Continued from the previous page)*

It is not only the general amateur astronomy equipment market that is changing. In the high-end, the best known manufacturer of Ritchey Chretien telescopes for astro-photographers, RC Optics (or RCOS) has closed its doors and is now out of business. This was partly because the government business which they relied upon has dried up, but also from competition from more affordable new entrants in the amateur market, particularly Planewave with their simpler to manufacture Corrected Dall-Kirkham (or CDK) imaging telescope designs. Another sad loss recently, was Van Slyke Instruments, a specialist vendor of rotators, turrets, focusers, spiders etc, whose workshop was destroyed by fire on June 11th with little chance of rebuilding in future. In eyepieces also, significant change has been occurring, most notably the appearance of Explore Scientific from nowhere to becoming a credible challenger to Televue through directly competitive eyepieces aggressively priced along with recent innovative designs, all of which is now buying them market share at the expense of Meade and others.

Competition is always healthy of course and new vendors are certainly filling the gaps being vacated by the above companies.

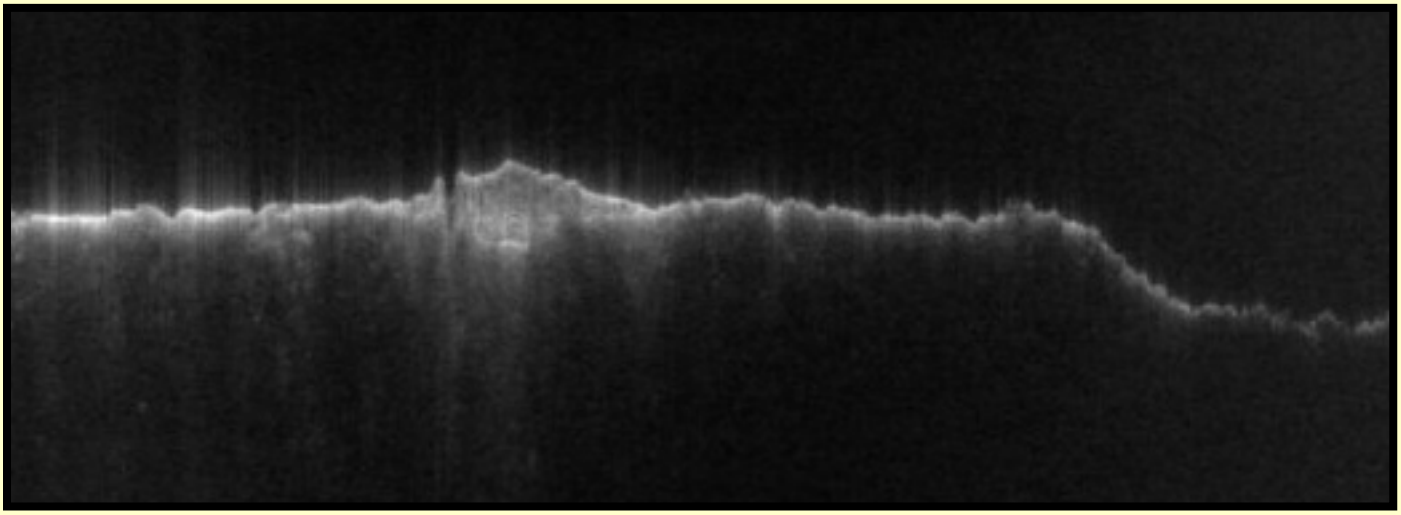
Just a recent perusal of Sky and Telescope or Astronomy reveals a number of new manufacturers who were unknown just a few years ago, and we all continue to enjoy the option of many buying choices at every price point. In fact today is in every way the golden age for amateur astronomy equipment with a greater variety of equipment choices at higher levels of quality and capability than ever before. At the same time however, I wanted in this Presidents Corner to acknowledge the past importance of Meade to amateur astronomy over the last few decades. Clearly poor business and product decisions, unwise litigation, aligned with the changing market has led the company into what appears a terminal situation, but many MDAS members no doubt possess or once possessed Meade telescopes, eyepieces, and accessories, and it is sad that what was at one time a major player of considerable importance in amateur astronomy has been reduced to this position. Hopefully by this time next month the situation for Meade will have resolved itself favorably for the employees of the company and the owners of their products.

Clear skies!

Chris Ford

What Lies Beneath

by the European Space agency



A slice through the southern highlands of Mars

12 August 2013— There is much more to Mars than meets the eye. By using the radar on Mars Express, we can see several kilometres below the surface to see what lies beneath.

The radar creates subsurface images of Mars by beaming low-frequency radio waves towards the planet, which are reflected from any surface they encounter. While most are reflected by the planet's surface, some travel deeper and bounce off interfaces between layers of different material, such as between rock, water or ice.

The strength and timing of the radar echoes that arrive back at Mars Express are a gauge of the depths of different types of underground interfaces.

This radar image is a 5580 km-long slice through the southern highlands of Mars created shortly after the Mars Advanced Radar for Subsurface and Ionospheric Sounding instrument became operational in 2005.

The right-hand side is dominated by the vast Hellas Basin. It plunges 7 km below the surface and is about 2300 km wide, making it one of the largest impact basins in the Solar System.

The bright peak just left of centre is the south polar region of Mars. This is where the radar comes into its own, for beneath the cap of frozen carbon dioxide and water ice it reveals multiple layers of ice and dust.

Known as the South Polar Layered Deposits, this feature extends nearly 4 km below the surface. The layers are thought to arise from variations in the deposition of ice and dust as Mars experienced cycles of climate change.

Thanks to the radar, scientists have estimated that the amount of water trapped in frozen layers in the south polar region is equivalent to a liquid layer about 11 m deep covering the planet.

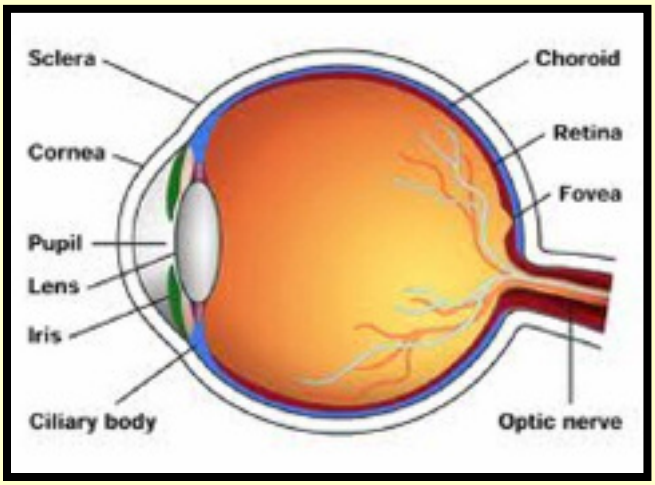
Keep Your Best Optics Working Well.

by Jim Scala

Nature spent four-billion years perfecting the most marvelous optical instruments known; our eyes.

Modern science has evidence that our eye-brain combination uses quantum mechanics to convert light striking the retina into an image we can see, remember and visualize the image again later. But, like the rest of our body, eyes are susceptible to problems and the most common is cataracts. Everyone will get them if we live long enough because it's part of living on planet Earth.

A cataract occurs when the eye lens becomes cloudy, like a dirty window, objects are somewhat fuzzy and colors dull. As one eye doctor said, "I can tell when women need cataract surgery because they wear very bright clothes." By age 60, over 23% of us will have sufficient cataract development to consider surgery and 3% will require it before age 50 – it's part of aging.



A cross section of the human eye showing the location of the most common eye problems that have very clear dietary relationships.

In the last century, epidemiologists noted that cataract development correlated with geographic location, lifestyle, and food habits. Turns out that ultraviolet (UV) light hitting the eye lens is the root cause, so they're most prevalent where atmospheric ozone is lowest, but they develop wherever the sun shines. People who have diets poorest in fruits and vegetables get them sooner as do people who are overweight. Those statistics almost describe the cause and explain prevention.

Cataracts are caused by UV light striking the eye lens causing oxidation of the transparent lens proteins.

Since an oxidized protein is no longer transparent, the lens slowly clouds in proportion to exposure. Their development is accelerated by smoke, smoking, and volatile solvents, so avoiding these environmental factors is a no-brainer. It's logical to wear UV blocking sunglasses when outdoors. But, the most important preventable factors in cataract development are vegetables and fruits. Obviously, diet plays a big role in cataract prevention.

Our body expends energy to elevate the antioxidant, vitamin C, and two bioflavonoids, lutein and zeaxanthine, to high levels in the eye lens. So the lens's composition indicates that protection against oxidation is essential. Prevention is about food choice.

I doubt your mom was thinking cataracts when she said, "Eat your vegetables," but she would have been correct. We need at least four and preferably five servings of vegetables daily, including at least one leafy and one cruciferous such as broccoli, four fruit servings and some whole grain. Ideally your vegetables include collard greens and kale, but since they aren't generally available, one daily serving of spinach and one other leafy vegetable is preferable as is a serving of whole grain. Fruit should include at least an orange or a glass of full-pulp orange juice – grapefruit also works. Surprisingly, persimmons are especially rich in all the correct antioxidants.

Cataract's correlate with overweight because the byproducts of fat metabolism cause oxidation. Keeping weight in line is important to every aspect of health and vision simply fits that general pattern.

While no studies have proved that a pill providing antioxidants prevents cataracts, studies indicate that a multiple vitamin-mineral supplement daily helps and a

Keep Your Best Optics Working Well *(Continued from the previous page)*

new supplement that provides lutein and zeaxanthine makes sense. On average, we spend over a dollar every day on soft drinks, so a multiple vitamin and ocular supplement is cheap in comparison. However, supplements cannot substitute for good eating habits.

Genetics are involved in cataracts and other more serious eye problems that involve the retina.

Since you can't choose new parents, focus on factors you can control. Visualize your eye's retina as brain tissue, then the diet-related factors fall into place. One major brain tissue component is the omega-3 oil DHA (docosahexaenoic acid). DHA is a fatty acid, essential for brain function and is easily oxidized and protected by antioxidants, especially vitamin E. It's obtained directly from fish, and your body produces it from a plant omega-3 oil called ALA (alpha linolenic acid). That is found in flax and canola oils, walnuts, almonds and in some in leafy vegetables. Since our body is inefficient in converting ALA to DHA, a more direct source helps. That's where fish and fish oil are important because they're good sources of DHA.

When DHA is seriously short or is oxidized by lack of antioxidants and these retinal problems emerge, it can take about two years to restore the deficit. This biochemistry moves in slow motion, so prevention is the best approach to make sure that never happens.

We get these omega-3 oils directly from cold-water, blue-skinned finfish, such as tuna, salmon and other oily fish. Vegetable sources of ALA include flax seed oil, some nuts, such as walnuts, canola and grape seed oil. A tablespoon of flax oil on some high-fiber whole-grain cereal topped with soy milk is an inexpensive, daily plan backed by a very large body of research – I do it myself. Many experts recommend one or two capsules of fish oil and daily.

An old wives tale, from the15th century teaches, "Always have color on your plate." Though it focused on cancer prevention, it guaranteed adequate antioxidants. Consequently, modern science has proven this folk wisdom was correct far beyond its intention.

Many of these antioxidants are carried in the blood on the back of good cholesterol, better known as HDL (high-density lipoprotein cholesterol). Blood HDL is elevated by keeping fit. That means sufficient aerobic exercise to get a training effect which translates to brisk walking for 40 minutes or jogging for 20 minutes. If you like numbers, any steady exercise that burns at least 250 calories per session works. Some men have especially low HDL levels, but not so with women who are protected by their hormones. Modern medications, the statins, can elevate HDL levels. Although your physician prescribes them for good heart health. This article points out that it'll also help your eyes.

Doctors can work miracles these days, but they'll agree that prevention is the best medicine and food is the vehicle of its practice.

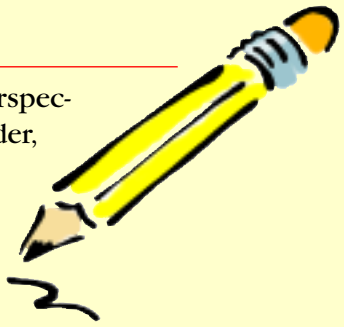
Establish the simple eating, exercise habits and supplement habits I described here and you will be doing much to maintain healthy vision along with good general health.

Jim Scala, a past president of MDAS, received his Doctorate in biochemistry from Cornell and did post-doctoral studies in nutrition. His books on nutrition earned him an honorary Doctor of Humane Letters from Hofstra University. He is an active amateur astronomer.

Mount Diablo Astronomical Society Event Calendar–August 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28	29	30	31	1	2	Society Observing (Private) 3 Sunset: 8:15 PM
4	5	6	7	8	9	Int'l Starry Night 10 7:30 PM Public Astronomy Sunset: 8:08 PM
11	Board Meeting (Private) 12	13	14	15	8:00 PM SB Sidewalk Stargazing 16	17 Sunset: 8:00 PM
18	19	20	21	22	23	10:00 AM Docent Training Session 24 Sunset: 7:50 PM
25	26	7:15 PM GenMtg: Kepler Status 27	28	29	30	Observatory Maintenance (Private) 31 Sunset: 7:39 PM

As Always Writers Are Wanted



We are always looking for new articles and content. If you have astronomical perspectives or experiences to share with your fellow members that you would us to consider, please feel free to contact me Chris (cford81@comcast.net) or our newsletter editor Vianney. (veloroute@hotmail.com)

Clear skies!

Chris and Vianney

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General Meetings:
Fourth Tuesday every month, except on the third Tuesday in November and December. Refreshments and conversations at 6:45 pm; Meeting begins at 7:15

Where:
Lindsay Wildlife Museum
1931 1st Avenue
Walnut Creek, CA 94597
(925) 935-1978
wildlife-museum.org.

Directions to facility:
From the North: Take 680 South to Treat Blvd. exit. Turn left at light onto North Main St. Turn right on Geary Road. Turn left on Buena Vista. Turn right on First Avenue. The museum is halfway up the block on the left.

From the South: Take 680 North. Take the Treat Blvd./Geary Road exit and turn left over freeway. Go three more lights and turn left on Buena Vista. Turn right on First Avenue. The museum is halfway up the block on the left.

Parking:
The museum is located in a residential area. There are no parking fees nor meters. Please park only in the museum parking lots on the east side of the museum, the Friends Church lot across the street (except Sunday mornings) or on Buena Vista Avenue. Please do not park on First Avenue in front of our neighbors' homes — you will get a parking ticket.